"Peer-Led Teaching in Surgical Case Management: Can Virtual Reality increase medical student confidence in approaching real-life Post-Surgical Complications?"

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Background

- A primary challenge of medical education is the lack of standardised surgical curriculum amongst UK medical schools. (1)

- This can limit the development of hands-on proficiency in management of the surgical patient. Peer-led teaching is a proposed solution to teaching skills as an adjunct to the standard curriculum (2)

- VR has shown to have increased positive learning outcomes in medical education when compared to traditional teaching methods. (3, 4)

- There is paucity of data concerning peer-led and VR teaching as medical education tools in the domain of surgery.

- These results could help narrow or expand the techniques used in surgical education amongst medical students.

Aims

1. Evaluate the efficacy of peer-led teaching and the role of virtual reality (VR) in post-surgical complications

2. Understand the impact of performance affecting factors (core knowledge coverage, quality of teaching, confidence in peer tutors, and engagement) in peer-led VR teaching.

Methods

- Single-group interventional study

- Inclusion Criteria: Medical students in Years 4-6 (Clinical Years) of the 6-year MBChB programme

Peer-led Teaching — Medical students in clinical years (n=30) participated in a peer-led tutorial on 'common post-surgical'. Standardised PowerPoint was created for the delivery of the session, to ensure consistency across sessions. Each tutorial consisted of two tutors (n=10) and up to 8 participants.

VR Simulation — Participants (n=30) then attempted a VR scenario designed to apply acquired knowledge and improve their understanding of decision-making in surgical scenarios.

Data Capturing — Participants filled in a 13-item questionnaire using 5-point Likert scales at the end of the tutorial (covering participant's perceived baseline understanding, assessing efficacy of peer-led teaching, efficacy of VR technology in medical education and evaluated performance pressure)

Statistical Analysis

- The non-parametric paired Wilcoxon signed rank test was used to compare the distribution of ordinal data. Results were considered significant at the $p<0.05$ level.

Results

Efficacy of peer-led teaching in simulating post-surgical complications

Perceived confidence (Likert Scale)
Before Peer-led teaching

Perceived confidence (Likert Scale)
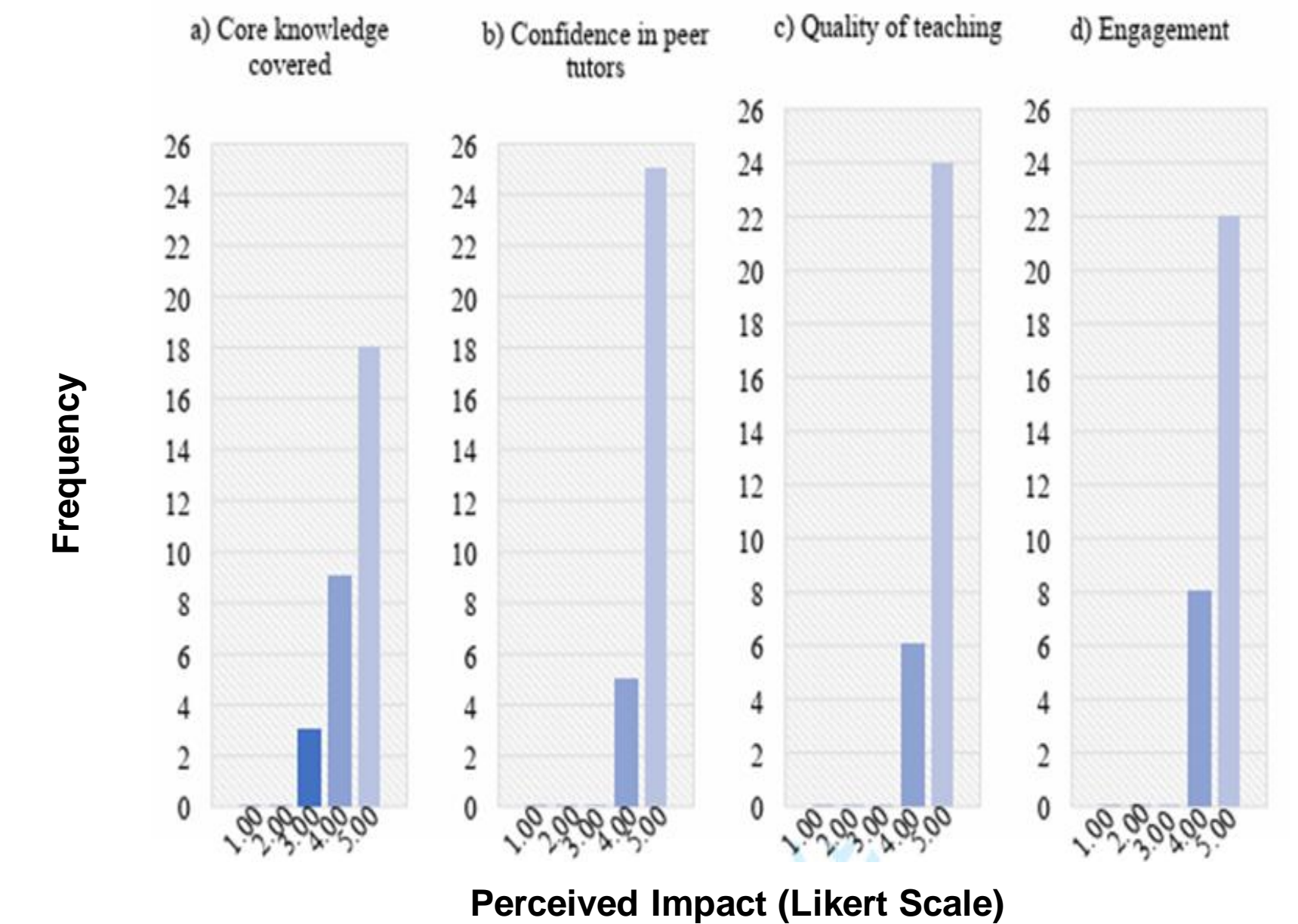*After Peer-led teaching*
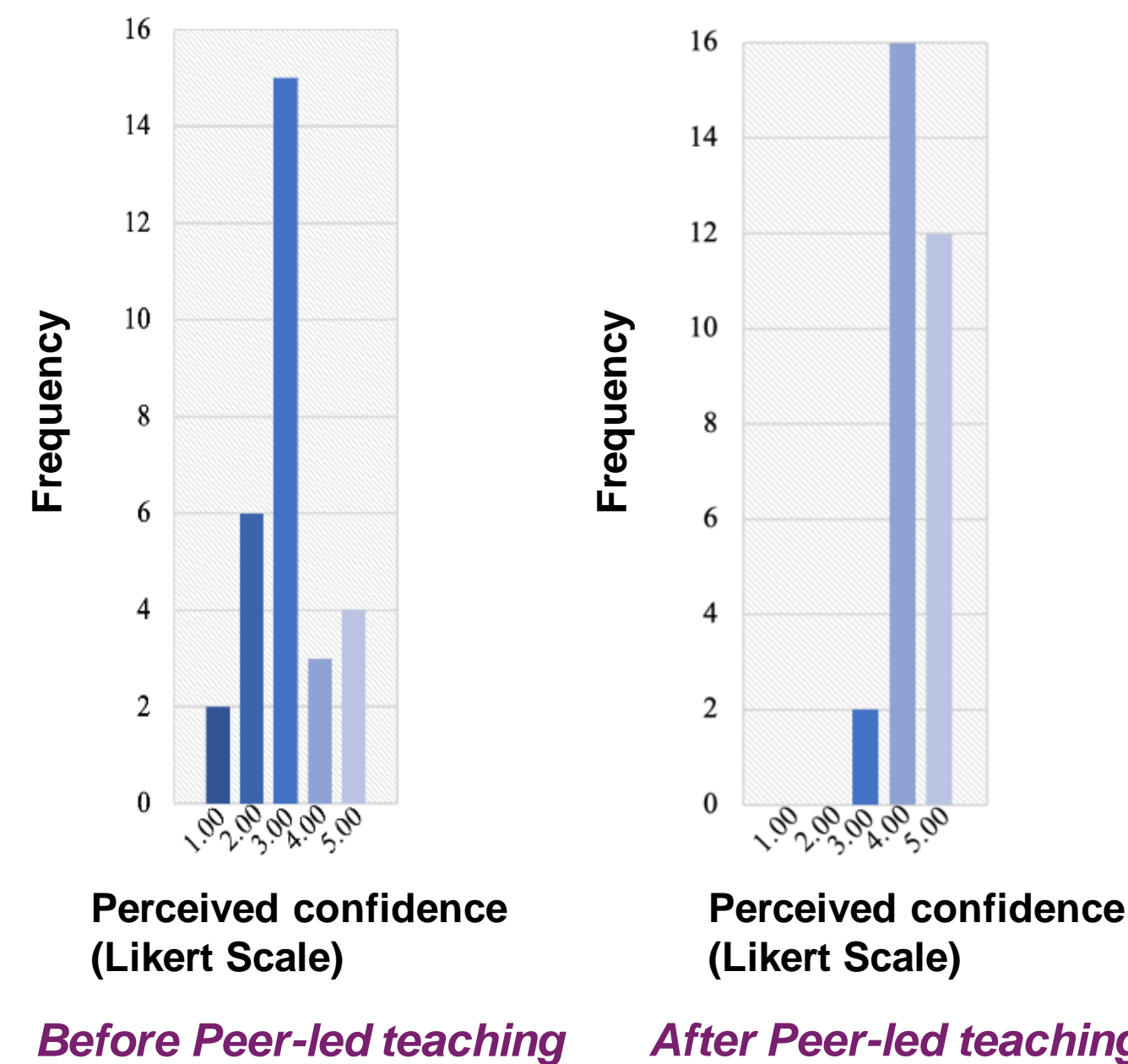
Participants found the peer-led teaching allowed for greater preparation for the VR scenario compared to only previous medical education **($p<0.05$).**

Efficacy of VR simulation in student confidence approaching real-life post-surgical complications

Perceived confidence (Likert Scale)
Before VR simulation

Perceived confidence (Likert Scale)
After VR simulation
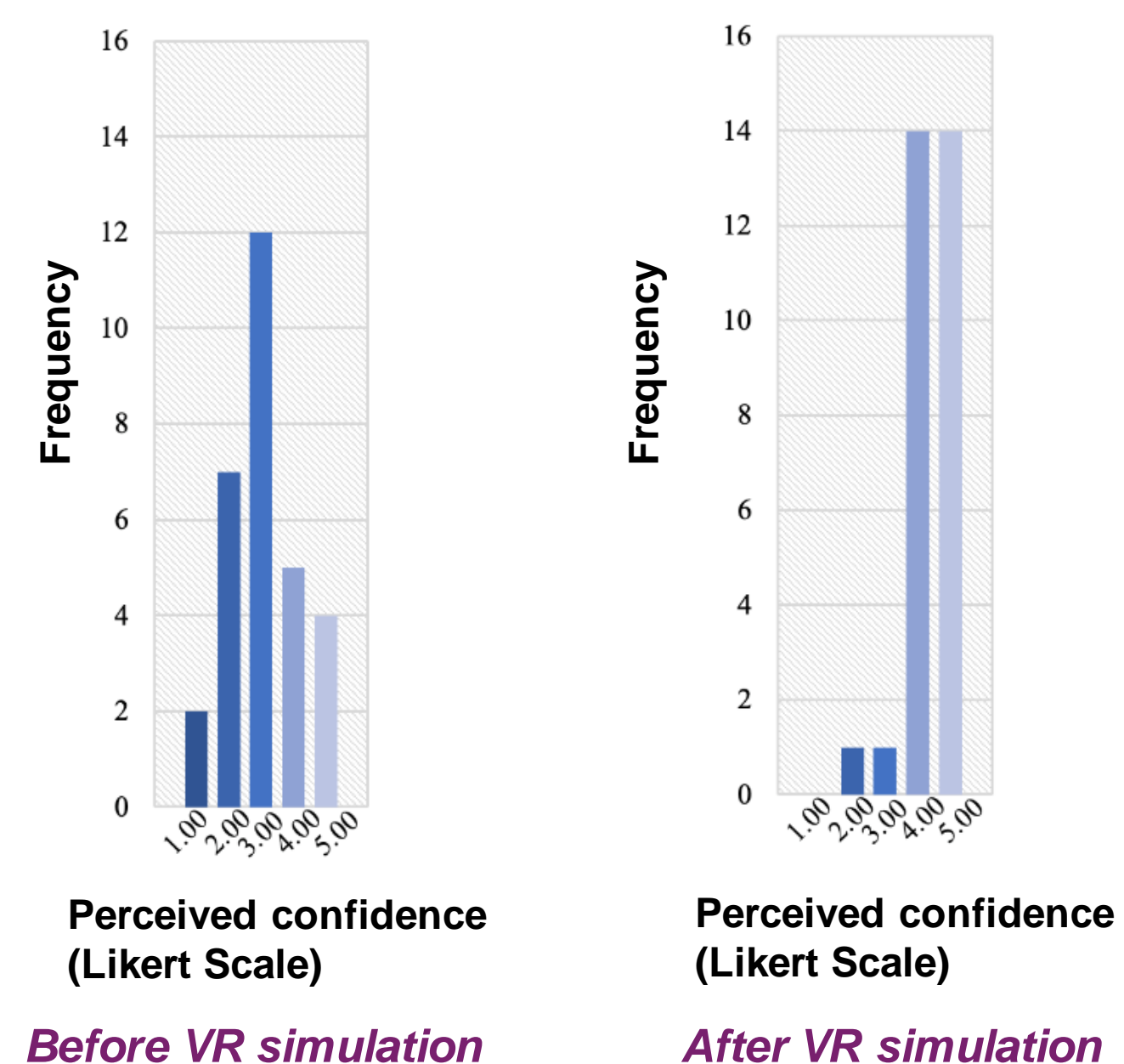
The median of differences after peer-led teaching and after VR simulation was **statistically insignificant** (p=0.76)

Factors affecting peer-led teaching of post-surgical complications

a) Core knowledge covered b) Confidence in peer tutors c) Quality of teaching d) Engagement

Perceived Impact (Likert Scale)

- 27 (90%) participants rated coverage of core knowledge as ≥4
- 30 (100%) participants rated confidence in their peer tutors, quality of teaching, and engagement as ≥4

***Likert Scale legend**: 1= Strongly disagree/very unconfident, 2= Disagree/unconfident, 3=Neutral, 4=Agree/Confident, 5=Strongly Agree/Very Confident

Discussion & Conclusion

- Our study demonstrated that peer-led teaching increased confidence in approaching patient scenarios, with 28 (93%) participants showing marked improvement or maximal Likert rating post peer-led teaching.

- Raised confidence in peer tutors, high-quality teaching, and increased engagement have positive impacts on peer-led VR teaching.

- VR simulations demonstrated to be a useful adjunct to peer-led methods.

- Although VR simulation by itself has not demonstrated statistical significance with improved confidence, the development of novel technology tailored to improving medical education can serve as tools to mitigate the limitations in current training resources.

- Further VR models or design platforms allowing for enhanced visual fidelity may allow students to better immerse themselves in the scenario and allow it to play a more prominent role in medical education.

References

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